

I support developing a method to provide broadband service to all areas of the country. The Internet, in its current state is, what I call, the new library of Alexandria. With careful searching, one can find any type of information from hobby to life altering medical information. One can easily join with others having a common interest and both help and be helped in learning new skills. If education is to be a priority in this country, and it should be and is certainly a serious need, it has been said many times by others that wide availability of such a system allows a great opportunity for an average increase in education level across the country.

However, I also believe it is the primary responsibility of the FCC to guarantee the development of technically sound standards and methods of spectrum use. We are all aware that it is possible to violate the laws of a country, however, it is not possible to violate physical laws.

As an experienced, Senior RF Engineer with a leading radio systems manufacturer also with responsibility for electromagnetic compatibility in a wide range of equipment, it was quite clear from the start that proposing terrestrial transmitters in parts of the spectrum reserved for satellite transmission or the guard bands was obvious error and ill conceived. I frankly do not believe the waiver for LightSquared testing should have been granted based on simple, widely known radio system design and spectrum planning concepts. The tests that were done and presented to the FCC by GPS manufacturers were not to see if the problem existed, but to demonstrate that it was clearly certain and not just theory.

Despite claims to the contrary, the previously designed GPS system that was carefully designed using well thought out considerations for technical standards and economics cannot be considered as interfering with a proposed system when the proposed system ignores well known and longstanding principles of engineering and spectrum planning; yet this is precisely what the LightSquared plan did. I do not understand how the FCC, having responsibility for maintaining technical performance standards in the area for electromagnetic compatibility for so many other systems, ignored such obvious issues for the LightSquared proposal. Technical oversight appeared to be nonexistent.

As pointed out by the NTIA, GPS manufacturers and GPS users, it was easily demonstrated as folly, that simply stating that a technical problem will dissolve by simply mandating the 'repair' of a previous, complex and widespread system that was carefully designed using orchestrated spectrum planning. It was also folly to insist that an existing system will interfere with the proposed system because of the ill conceived nature of the new system, when precisely the reverse would be fact.

The FCC has had a long standing responsibility to be the guardian of the spectrum as a natural resource for the common good and I believe it failed in the first place, in granting the waiver. The subject at hand requires maintaining the highest of technical standards to accomplish both a nation-

wide broadband system and provide for technically sound spectrum usage. Radio system design and spectrum planning are complex subjects that require careful technical considerations, not loose, unscientific beliefs, nor can this be done with simple political desires; no matter how desired or needed a new system may be.

Any new, wide spread system must include a broad and appropriate range of electromagnetic compatibility consideration to ensure coexistence with existing systems. This, I believe, is a major responsibility of the FCC and it appears to me that this, as well as the recent BPL Access attempts, were nothing more than wishful thinking having nothing to do with sound design principles; and, in fact, clearly violated well known and sound engineering design principles.

While perhaps not an absolute given that the national broadband system be radio based, I believe this is a viable area of focus - as long as sound, well known engineering standards, principles and standards are used throughout the process.

In addition, with the wide-spread increase and projected growth of "Wireless Technology" in too many areas to mention here, the opportunity of two things must also be very seriously considered.

One is the steadily increasing density of wireless devices. As wireless density increases the background level of RF radiation will increase. This is easily demonstrated as recent devices increase in number and the increasing RF background can be seen with simple spectrum analysis. Interference opportunities will continue increase. The signal levels for a single device to interfere with another single device can fairly easily be calculated and demonstrated. The current Part 15 limits can easily fall far short of what is required to account for tens or hundreds of similar intentional and unintentional radiators in close proximity. In areas where people congregate and expect wireless connectivity is where interference potential is highest resulting in reduced connectivity.

The other is security. Systems using increasing wireless technology, for example: heart pacemakers, automobiles, passport RFID and EDL (Electronic Driver License) RFID, have already been shown to be easily hacked into, defeated, and even controlled at a distance thus affording the hacker complete anonymity provided by the same wireless technology used in the devices. In the case of autos with remote communications and controls such as door locking and engine disabling, the remote control of the auto can be perpetrated from anywhere in the world via existing telephone systems.

In addition, something that, at first blush, sounds impossible to implement must be considered. Outside, intentionally harmful attacks, now relatively common on various segments of the Internet systems must be anticipated and the system designed to be quickly reconfigured to fend off attacks that do not fit the methods anticipated. This is required because as systems become more sophisticated, the methods discovered by those interested in defeating the system can, by design

standards, be quite unorthodox yet very effective in crippling or hacking portions of the system.

One capability of the current Internet system was viewed long ago by many as being a foolish implementation. The inability to confirm or force accurate identification of originators of communications such as emails now proves to be a major fault in the system and is clearly exploited by many with less than honorable intentions.

In addition as this system becomes the major communications medium of the future, or the "new phone system" there is an obvious and related matter before the FCC, namely the telemarketing, robocall, unwanted incoming telephone calls and text message issue (02-278 Telephone Consumer Protection Act). With a higher speed system, such widely annoying practices could become, if unanticipated and prevented, become a much bigger problem.

I believe it is incumbent upon, and challenge, the FCC to consult reliable, highly experienced RF systems Engineers in considering the national broad band system. Using established guard bands improperly, as in the LightSquared proposal, or attempting to use transmission media ill suited to conveying RF over long distances, as in the Access BPL attempts, shows little responsibility to maintain technically sound practices, nor attention to the common good.

I am aware of one Internet demonstration video of an antenna, and possibly filter, that claims to eliminate the Lightsquared to GPS desensitization. This antenna may have demonstrated in (what was claimed to be) an anechoic chamber, under tightly controlled conditions, that one such signal could be eliminated from one specific GPS antenna and receiver. Unfortunately it completely ignores the well known and very complex and turbulent ocean of an electromagnetic field that actually exists in the true environment where it is required to perform. It also ignores the economical considerations of retrofitting all existing GPS receivers with such a device as well as the practicality of retrofitting it to mobile and hand held units.

With many industries vying for spectrum, I believe the FCC must also first develop a well thought-out priority list to place the broad band plan in its proper perspective relative to the interests of all those interested in occupying spectrum as well as a higher ground consideration for the common good.

I have heard of comparisons critical of the U.S because it is far behind other countries relative to the level of internet coverage across the country. This is a misapplied comparison as it completely ignores the fact that many countries with high internet coverage are quite small and have quite dense populations without expansive rural areas as in the U.S.

In summary, I submit that to truly show responsibility for the common good as the FCC charter, the FCC must seriously consider the following:

- 1 - The laws of physics cannot be managed away, nor argued away on political or personal preference grounds. It is the responsibility of the FCC to enlist highly experienced RF system engineers as consultants in developing the technical standards of a nation-wide broad band radio system; with what must be the most stringent restrictions on conflict of interest. The full gambit of all known electromagnetic compatibility areas as well as economics and benefit for the common good must be major considerations in this system.
- 2 - The FCC must delineate and define a priority hierarchy for spectrum usage for all those vying for spectrum. If a national broad band delivery system is a high priority, then the benefits of all proposals seeking spectrum must be evaluated on a national benefit scale and spectrum allocated in a manner that best serves the common good, not simply the highest bidder.
- 3 - The FCC must [seek an independent organization to] develop a complete and fully documented process by which such a system can be developed. This process plan can be modeled beginning with common industry quality systems such as ISO and the telecommunications industry extension of ISO called TL 9000. Such a quality system focuses on adherence to an effective process and development of standards aimed at achieving a viable design within targets for functionality, cost, time.
- 4 - Evaluate the projected wireless device densities expected for this system (and potentially conflicting systems) well into the future and re-evaluate intentional and unintentional radiation limits to account for the peak densities that will be common. If this system will accomplish truly inexpensive wireless service for a very high percentage of the population, it can easily be anticipated that virtually everyone in any given vicinity will be susceptible to and be causing interference to every other device; not simply a one to one situation as current Part 15 limits assume.
- 5 - With wireless (radio) technology being a major input/output channel to more and more devices that have a direct impact on individual safety and security here and abroad, charter all wireless developers and possibly promulgate regulations requiring them to adhere to advanced security techniques in all wireless systems because this easily effects public safety and security.

Regards, Steve Noskowicz